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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/782,573	EHRMAN ET AL.	
	Examiner	Art Unit	
	Christopher J. Clark	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 April 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 April 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed April 20, 2007 have been fully considered but they are not persuasive. In regards to Claims 1 and 19, the applicant argues that the amendments disclose limitations that are not taught by either Melcher or Lange. The examiner respectfully disagrees.

2. In regards to the amendments to Claim 1, Melcher teaches the forward converter operable to ***dynamically*** convert an input voltage in Lines 26-47 of Column 2. Furthermore, Lange discloses in Lines 39-59 of Column 1 and Lines 47-66 of Column 3 that the boost converter accepts a wide range of input voltages to provide to the forward converter. The examiner considers a wide range of input voltages to be synonymous with a ***plurality of nominal input voltages.***

3. In regards to the amendments to Claim 19, Lange discloses in Lines 39-59 of Column 1 and Lines 47-66 of Column 3 that the boost converter accepts a wide range of input voltages to provide to the forward converter. The examiner considers a wide range of input voltages to be synonymous with a ***plurality of nominal input voltages.***

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, 4, 5, 6, 8, 10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Melcher (U.S. Patent 4,517,633) in view of Lange et al (U.S. Patent 5,179,508).

3. In re Claim 1, Melcher teaches a power supply as seen in Figure 1:

- a forward converter (entire content of FIG 1, Column 2 Line 19)
- said forward converter connected to an input voltage ("U_{ip}," Column 2 Lines 21-22)
- said forward converter creating a plurality of regulated (as performed by regulators 28, Column 2 Lines 63-65; all outputs are disclosed with regulators in Fig 4) output voltages (10, 11, 12, Column 2 Lines 33-35)
- said forward converter operable to dynamically convert an input voltage (Lines 26-47 of Column 2)

4. Melcher does not teach a selectively actuated boost converter coupled to the input and operable to selectively boost the input voltage.

5. Lange et al teaches the following as seen in Figure 1:

- A boost converter (5, Column 2 Line 14)
- Said boost converter (5) coupled to an input (7, Column 2 Line 15)
- Said boost converter is selectively activated (Column 2 Lines 59-61)
- The boost converter accepts a wide range of input voltages to provide to the forward converter (Lines 39-59 of Column 1 and Lines 47-66 of Column 3)

6. The advantage of placing a selectively activated boost converter as taught by Lange et al in front of the forward converter is to provide a power system with significant overall power efficiency improvement in applications requiring a wide range of inputs (Column 3 Lines 45-53).

7. Melcher discloses the claimed invention except for the selectively activated boost converter. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to place a selectively activated boost converter as taught by Lange et al in front of the forward converter, since Lange et al states that such a modification would provide a power system with significant overall power efficiency improvement in applications requiring a wide range of inputs (Column 3 Lines 45-53).

8. In re Claim 2, the examiner observes the invocation of 35 U.S.C 112 6th paragraph. Lange et al discloses the means specified by the disclosure of the instant application and is therefore considered to make a *prima facie* case of equivalence. Lange et al teaches the following:

- The booster circuit remaining turned off when an input voltage is greater than a predetermined reference voltage (Column 2 Lines 59-61).
- The booster circuit turns on when an input voltage is less than a predetermined reference voltage and operates as follows:
- PWM duty cycle of signal controlling transistor (21) is regulated by a controller circuit (27) [Column 3 Lines 14-19]
- When transistor (21) is on it connects to ground (as seen in FIG 1), energy is stored on an inductor (17) as current flows to ground [Column 3 Lines 19-20]

- When transistor (21) is then turned off, energy is released to a capacitor (25), which supplies the forward converter [Column 3 Lines 20-22].

9. It is apparent that Lange et al discloses the boost converter function disclosed by the instant application.

10. In re Claims 4, Lange et al discloses that combining a boost converter in front of the forward converter provides greater efficiency for a wide range of input voltages (Column 3 Lines 45-51).

11. Melcher as modified by Lange et al does not disclose a specific wide range input ratio of greater than 6.5:1. The instant application fails to disclose the criticality of the range. It would have been obvious to one skilled in the art at the time of the invention was made to provide an input voltage ratio of 6.5:1 since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller,* 105 USPQ 233.

12. In re Claims 5, Lange et al discloses that combining a boost converter in front of the forward converter provides greater efficiency for a wide range of input voltages.

13. Melcher as modified by Lange et al does not disclose a specific efficiency in excess of about 75%. The instant application fails to disclose the criticality of the range of values outside of those disclosed by Melcher as modified by Lange et al. It would have been obvious to one skilled in the art at the time of the invention was made to provide a power supply with efficiency in excess of about 75% since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller,* 105 USPQ 233.

14. In re Claim 6, Melcher teaches the use of an isolation transformer (4, Column 2 Line 20) which inherently provides ground isolation between the input voltage (located on the primary side (1, Column 2 Line 20)) and the plurality of output voltages (located on the secondary side (5,6,7,8, Column 2 Line 33)).

15. In re Claim 8, Melcher teaches the use of a coupled output inductor (1, Column 2 Line 20) to produce a plurality of output voltages. The primary winding of an isolation transformer (4, Column 2 Line 20) inherently acts as an inductor coupled both physically to the input and magnetically to the secondary windings (5,6,7,8, Column 2 Line 33) to provide a plurality of output voltages.

16. In re Claim 10, Melcher teaches the use of an isolation transformer (4, Column 2 Lines 19-20).

17. In re Claim 12, Melcher teaches the use of a low drop out regulator for each of the outputs (28 of FIG 4, Column 4 Lines 20-22).

18. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Melcher (U.S. Patent 4,517,633) in view of Lange et al (U.S. Patent 5,179,508) as applied to claim 1 above, and further in view of Reeves (U.S. Patent 4,447,866).

19. Melcher as modified by Lange et al has been discussed above, but does not teach cross regulating the output voltages.

20. Reeves teaches cross regulating the output voltages (Column 3 Lines 57-60).

21. The advantage of cross regulating the plurality of outputs is to provide significant cost savings (Column 3 Lines 61-62) and allow for the multiple outputs to be isolated from each other when only one controller is used (Column 3 Lines 65-67).

22. Melcher as modified by Lange et al discloses the claimed invention except for the implementation of cross regulation. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to cross regulate the plurality of outputs as taught by Reeves, since Reeves states that such a modification would provide significant cost savings (Column 3 Lines 61-62) and allow for the multiple outputs to be isolated from each other when only one controller is used (Column 3 Lines 65-67).

23. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Melcher (U.S. Patent 4,517,633) in view of Lange et al (U.S. Patent 5,179,508) as applied to claim 1 above, and further in view of Vinciarelli (U.S. Patent 4,441,146).

24. Melcher as modified by Lange et al has been discussed above, but does not disclose the use of a resonant reset circuit.

25. Vinciarelli discloses the implementation of a resonant reset circuit in a forward converter (20, 21, 22 of Fig. 4a; Column 5 Lines 33-35).

26. The advantage of implementing a resonant reset circuit in the forward converter is to reset the transformer's core (Column 4 Lines 11-12).

27. Melcher as modified by Lange et al discloses the claimed invention except for the resonant reset circuit. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to include a resonant reset circuit in the forward converter as taught by Vinciarelli, since Vinciarelli states that such a modification would reset the transformer's core (Column 4 Lines 11-12).

28. Claims 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Melcher (U.S. Patent 4,517,633) in view of Lange et al (U.S. Patent 5,179,508) as applied to claims 8 and

10 above, and further in view of Yannucci et al (U.S. Patent 3,766,504) and Landon (U.S. Patent 2,358,520).

29. Melcher as modified by Lange et al has been discussed above, but does not disclose the isolation transformer as being a trifilar wound, interleaved transformer.

30. Yannucci et al teaches the use of an interleaved transformer (Column 1 Lines 19-20).

31. The advantage of the transformer being interleaved is to improve the impulse voltage characteristics of the transformer and allow for more energy storage (Column 1 Lines 19-28).

32. Melcher as modified by Lange et al discloses the claimed invention except for the implementation of an interleaved transformer. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to include an interleaved transformer as taught by Yannucci et al, since Yannucci et al states that such a modification would improve the impulse voltage characteristics of the transformer and allow for more energy storage (Column 1 Lines 19-28).

33. Landon teaches the use of a trifilar wound transformer (13, Column 1 Lines 11-13).

34. The advantage of the transformer being trifilar wound is to provide a high mutual coupling between the coils so that transformation is made with minimum losses (Column 2 Lines 3-5).

35. Melcher as modified by Lange et al discloses the claimed invention except for the implementation of a trifilar wound transformer. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to include a trifilar wound transformer as taught by Landon, since Landon states that such a modification would provide a

high mutual coupling between the coils so that transformation is made with minimum losses (Column 2 Lines 3-5).

36. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Melcher (U.S. Patent 4,517,633) in view of Lange et al (U.S. Patent 5,179,508) as applied to claim 1 above, and further in view of Becky (U.S. Patent 4,462,069).

37. Lange et al teaches the implementation of a capacitor bank (11, Column 2 Lines 17-18) which inherently provides protection from line drop out as capacitors function to store charge and maintain voltage.

38. Melcher as modified by Lange et al has been discussed above, but does not disclose the following:

- Over-current protection
- Over voltage protection

39. Becky teaches the following:

- Over-current protection (circuit breakers CB1 and CB2, Column 3 Lines 33-39)
- Over voltage protection (voltage suppressor Z1, Column 3 Lines 44-46)

40. The advantage of providing over-current and over-voltage protection in the input is to safeguard the power supply as well as the loads connected to it.

41. Melcher as modified by Lange et al discloses the claimed invention except for the implementation of over-current and over-voltage protection. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to include over-current and over-voltage protection in the input circuit in order to safeguard the power supply as well as the loads connected to it.

42. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Melcher (U.S. Patent 4,517,633) in view of Lange et al (U.S. Patent 5,179,508) as applied to claim 1 above, and further in view of Bloom (U.S. Patent 4,821,163).

43. Melcher as modified by Lange et al has been discussed above, but does not teach the use of a linear regulator circuit coupled to receive the input voltage to provide a start-up bias voltage.

44. Bloom teaches the use of a linear regulator circuit to provide a start up bias voltage (Column 10, Lines 39-50). It should be noted that according to Figure 7, the linear regulator circuit (shown in Fig 7B) is connected prior to the converter. All circuitry prior to the converter is considered input circuitry by the examiner. The linear regulator circuit (Fig 7B) is therefore considered coupled to the input to receive an input voltage.

45. The advantage of providing a linear regulator is to put the forward converter into operation upon initial activation (Column 2 Lines 10-11).

46. Melcher as modified by Lange et al discloses the claimed invention except for the implementation of a linear regulator circuit. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to provide a linear regulator circuit coupled to receive the input voltage as taught by Bloom, since Bloom teaches that such a modification would put the forward converter into operation upon initial activation (Column 2 Lines 10-11).

47. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Melcher (U.S. Patent 4,517,633) in view of Lange et al (U.S. Patent 5,179,508) as applied to claim 1 above, and further in view of McDonnal (U.S. Patent 5,428,523).

48. In re Claim 15, Melcher as modified by Lange et al has been discussed above, but does not teach the implementation of a circuit for disabling the boost operation of the boost converter in response to a sleep mode signal.

49. McDonnal teaches using circuitry (14, Column 5 Lines 52-53) to disable the boost operation of the boost converter (10, Column 5 Lines 43-45). McDonnal also teaches using a sleep mode control signal (20, Column 5 Lines 65-68) to disable the boost converter (Column 5 Lines 67-68 and Column 6 Lines 1-3). It should be noted that the examiner considers the use of port 20 "as a point to apply a logic low signal to disable the module" (Column 6 Lines 2-3) as an adequate equivalent of a sleep mode control signal.

50. The advantage of disabling the boost operation of the boost converter with a sleep mode control signal is the conservation of energy of the power supply (Column 2 Lines 47-52).

51. Melcher as modified by Lange et al discloses the claimed invention except for disablement of boost converter with a sleep mode control signal. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to disable the boost operation of the boost converter with a sleep mode control signal as taught by McDonnal, since McDonnal states that such a modification would conserve energy of the power supply (Column 2 Lines 47-52).

52. In re Claim 16, Melcher teaches the use of a low drop out regulator for each of the outputs (28 of FIG 4, Column 4 Lines 20-22).

53. Melcher modified by Lange et al has been discussed above, but does not teach the implementation of a circuit for disabling the low drop-out regulator in response to a sleep mode signal.

54. McDonnal teaches using circuitry (14, Column 5 Lines 52-53) to disable the low drop-out regulator (10, Column 5 Lines 43-45). McDonnal also teaches using a sleep mode control signal (20, Column 5 Lines 65-68) to disable the low drop-out regulator (Column 5 Lines 67-68 and Column 6 Lines 1-3).). It should be noted that the examiner considers the use of port 20 "as a point to apply a logic low signal to disable the module" (Column 6 Lines 2-3) as an adequate equivalent of a sleep mode control signal.

55. The advantage of disabling the low drop-out regulator with a sleep mode control signal is the conservation of energy of the power supply (Column 2 Lines 47-52).

56. Melcher as modified by Lange et al discloses the claimed invention except for disablement of low drop-out regulator with a sleep mode control signal. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to disable the low drop-out regulator with a sleep mode control signal as taught by McDonnal, since McDonnal states that such a modification would conserve energy consumption of the power supply (Column 2 Lines 47-52).

57. Claims 17 and 18 rejected under 35 U.S.C. 103(a) as being unpatentable over Melcher (U.S. Patent 4,517,633) in view of Lange et al (U.S. Patent 5,179,508) as applied to claim 1 above, and further in view of Longenecker (U.S. Patent 4,389,124).

58. In re Claim 17, Melcher as modified by Lange et al has been discussed above, but does not teach the implementation of a supply status circuit that provides visual indication of power supply operations.

59. Longenecker teaches a supply status circuit (35, Column 3 Lines 37-41) that includes a visual indication of operations.

60. The advantage of including a visual indication of operations is providing the user with a clear indication of the operating status of the power supply.

61. Melcher as modified by Lange et al discloses the claimed invention except for the implementation of a supply circuit. It would have been obvious to one having ordinary skill in the art at the time of the invention to include a supply circuit in order to provide the user with a clear indication of the operating status of the power supply.

62. In re Claim 18, Longenecker discloses using 5 LEDs (40-44, Column 3 Lines 38-39) in his supply status circuit (35). Such an arrangement could inherently display three states of operation (including "on", "off", and "sleep") by designating a separate singularly illuminated LED for each state (such as LED 40 representing "on", LED 41 representing "off", and so on) or by providing a combination of illuminated LEDs to represent each state.

63. Claims 19, 20, 26, 29, 30, 31, 32, 33, 34, 35, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Melcher (U.S. Patent 4,517,633) in view of Lange et al (U.S. Patent 5,179,508).

64. In re Claim 19, Melcher teaches a power supply as seen in Figure 1:

- A forward converter (entire content of FIG 1, Column 2 Line 19)
- Said forward converter connected to an input voltage ("U_{ip}," Column 2 Lines 21-22)
- said forward converter creating a plurality of regulated (as performed by regulators 28, Column 2 Lines 63-65; all outputs are disclosed with regulators in Fig 4) output voltages (10, 11, 12, Column 2 Lines 33-35).

65. Melcher does not teach the following:

- A voltage booster including:
- A boost circuit
- A mode selector

66. Lange et al teaches the following:

- A boost circuit (5, Column 2 Lines 14-15) to boost an input voltage
- The boost converter accepts a wide range of input voltages to provide to the forward converter (Lines 39-59 of Column 1 and Lines 47-66 of Column 3)
- A mode selector (27, Column 2 Lines 36-37) that:
    - Activates the boost circuit if the input is less than a threshold voltage (Column 3 Lines 14-16)
    - Deactivates the boost circuit if the input voltage is greater than the threshold voltage (Column 2 Lines 59-61)

67. The advantage of placing a selectively activated boost converter as taught by Lange et al in front of the forward converter is to provide a power system with significant overall power efficiency improvement in applications requiring a wide range of inputs (Column 3 Lines 45-53).

68. Melcher discloses the claimed invention except for the selectively activated boost converter. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to place a selectively activated boost converter as taught by Lange et al in front of the forward converter, since Lange et al states that such a modification would provide a power system with significant overall power efficiency improvement in applications requiring a wide range of inputs (Column 3 Lines 45-53).

69. In re Claim 20, Melcher teaches the use of a low drop out regulator for each of the outputs (28 of FIG 4, Column 4 Lines 20-22).

70. In re Claim 26, Melcher teaches the use of an isolation transformer (4, Column 2 Lines 19-20).

71. In re Claims 29 and 30, Lange et al discloses that combining a boost converter in front of the forward converter provides greater efficiency for a wide range of input voltages (Column 3 Lines 45-51).

72. Melcher as modified by Lange et al does not disclose a specific wide range input ratio of atleast 6.5:1 or 10:1. The instant application fails to disclose the criticality of the ranges. It would have been obvious to one skilled in the art at the time of the invention was made to provide an input voltage ratio of 6.5:1 or 10:1 since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller,* 105 USPQ 233.

73. In re Claim 31 and 32, Lange et al teaches an input circuit comprising of both and inductor (17) and a capacitor (25) that smoothes the input voltage (Column 2 Lines 63-64). It should be noted that the examiner considers the act of filtering synonymous with "smoothing."

74. In re Claim 33, inductive and capacitive elements are components needed in both input and voltage booster circuitry as inductor (17, Column 2 Line 22) and capacitor (25, Column 2 Lines 33-34) are thought of as an input circuit by the examiner and are also integral to the booster circuit (5, Column 2 Lines 14-15) as seen in the figure.

75. In re Claim 34, Lange et al teaches the use of a switching regulator (27, Column 3 Lines 15-21).

76. In re Claim 35, Lange et al teaches the switching regulator being a pulse width modulated regulator (Column 3 Lines 15-18).

77. In re Claim 36, Lane et al teaches that the booster circuit is bypassed when the input voltage is greater than the threshold voltage (Column 2, Lines 59-67).

78. Claims 21, 22, 23, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Melcher (U.S. Patent 4,517,633) in view of Lange et al (U.S. Patent 5,179,508) as applied to claim 19 above, and further in view Spreen (U.S. Patent 4,703,409).

79. In re Claim 21, Melcher teaches a first transformer (4) having a primary winding (1) and a plurality of secondary windings (5, 6, 7, 8) [See Fig 1].

80. Melcher as modified by Lange et al has been discussed above, but does not teach a second transformer.

81. Spreen teaches the following as seen in Figure 12c:

- A second transformer (T2) having a plurality of windings (LA and LB) corresponding to the plurality of secondary windings (S1 and S2) of the first transformer (T)
- The plurality of windings (LA and LB) coupled to a plurality of secondary windings (S1 and S2) where the DC output voltages are available

82. The advantage of including a second transformer is to reduce current ripple in the output (Column 12 Lines 61-64).

83. Melcher as modified by Lange et al discloses the claimed invention except for implementation of a second transformer. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to include a second transformer as taught by

Spreen, since Spreen states that such a modification would reduce the current ripple in the output (Column 12 Lines 61-64).

84. In re Claim 22, Spreen teaches the plurality of windings (LB and LA) on the second transformer forming a coupled output inductance (LB forms a coupled inductance with S2 and LA forms a coupled inductance with S1). Note that the examiner's interpretation of the claim does not require the plurality of windings on the second transformer to form a coupled inductance exclusively with each other.

85. In re Claim 23, Melcher teaches the following:

- A sensor (17, Column 2 Line 37) to sense one of the plurality of DC output voltages
- A switch circuit (2) coupled to the primary winding (1) of the first transformer selectively actuated to draw energy through the primary winding of the first transformer (Column 2 Lines 22-26) in response to the sensed voltage (Column 2 Lines 50-56).

86. In re Claim 24, Melcher teaches the switching circuit comprising:

- A switch device connected in series with the primary winding of the first transformer (Column 2 Lines 21-24).
- A pulse width modulation control circuit generating a control signal for actuating the switching device, the control signal having a variable duty cycle set responsive to the sensed voltage (Column 3 Lines 59-68 and Column 4 Lines 1-2).

87. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Melcher (U.S. Patent 4,517,633), Lange et al (U.S. Patent 5,179,508), and Spreen (U.S. Patent 4,703,409) as applied to claim 21 above, and further in view of of Yannucci et al (U.S. Patent 3,766,504) and Landon (U.S. Patent 2,358,520).

88. Melcher as modified by Lange et al and Spreen has been discussed above, but does not disclose the transformers as being trifilar wound, interleaved transformers.

89. Yannucci et al teaches the use of an interleaved transformer (Column 1 Lines 19-20).

90. The advantage of including interleaved transformers is the improvement of the voltage characteristics of the transformers to allow for more energy storage (Column 1 Lines 19-28).

91. Melcher as modified by Lange et al and Spreen discloses the claimed invention except for the implementation of interleaved transformers. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to use interleaved transformers as taught by Yannucci et al, since Yannucci et al states that such a modification would improve the impulse voltage characteristics of the transformer and allow for more energy storage (Column 1 Lines 19-28).

92. Landon teaches the use of a trifilar wound transformer (13, Column 1 Lines 11-13).

93. The advantage of using trifilar wound transformers is to provide a high mutual coupling between the coils so that transformation is made with minimum losses (Column 2 Lines 3-5).

94. Melcher as modified by Lange et al and Spreen discloses the claimed invention except for the implementation of trifilar wound transformers. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to use trifilar wound transformers as taught by Landon, since Landon teaches that such a modification would provide a high mutual

coupling between the coils so that transformation is made with minimum losses (Column 2 Lines 3-5).

95. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Melcher (U.S. Patent 4,517,633) in view of Lange et al (U.S. Patent 5,179,508) as applied to claim 19 above, and further in view of Vinciarelli (U.S. Patent 4,441,146).

96. Melcher as modified by Lange et al has been discussed above, but does not disclose the use of a resonant reset circuit.

97. Vinciarelli discloses the implementation of a resonant reset circuit in a forward converter that obviates a need for a discrete snubber circuit (20, 21, 22 of Fig. 4a; Column 5 Lines 33-35).

98. The advantage of implementing a resonant reset circuit in the forward converter is to reset the transformer's core (Column 4 Lines 11-12).

99. Melcher as modified by Lange et al discloses the claimed invention except for the implementation of a resonant reset circuit. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to include a resonant reset circuit in the forward converter as taught by Vinciarelli, since Vinciarelli states that such a modification would reset the transformer's core (Column 4 Lines 11-12).

100. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Melcher (U.S. Patent 4,517,633) in view of Lange et al (U.S. Patent 5,179,508) as applied to claim 19 above, and further in view of Reeves (U.S. Patent 4,447,866).

101. Melcher as modified by Lange et al has been discussed above, but does not teach cross regulating the output voltages.

102. Reeves teaches cross regulating the output voltages (Column 3 Lines 57-60).

103. The advantage of cross regulating the plurality of outputs is to provide significant cost savings (Column 3 Lines 61-62) and allow for the multiple outputs to be isolated from each other when only one controller is used (Column 3 Lines 65-67).

104. Melcher as modified by Lange et al discloses the claimed invention except for the implementation of cross regulation. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to cross regulate the plurality of outputs as taught by Reeves, since Reeves states that such a modification would provide significant cost savings (Column 3 Lines 61-62) and allow for the multiple outputs to be isolated from each other when only one controller is used (Column 3 Lines 65-67).

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher J. Clark whose telephone number is 571-270-1427. The examiner can normally be reached on M-F, 7:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry can be reached on 571-272-2084. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CJC
06/04/2007

6/11/07

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